

### REMARKS

Applicant respectfully requests reconsideration of this application and reconsideration of the Office Action dated September 23, 2004. Upon entry of this Amendment, claims 1-30 will remain pending in this application.

A three-month extension of time, together with the associated fee, is filed herewith.

Claims 1-6, 8-9, 12-20, and 22-27 stand rejected under 35 USC § 103(a) as being obvious over U.S. Pat. No. 5,615,318 to *Matsuura* ("*Matsuura*") in view of U.S. Pat. No. 6,232,980 to *Liepa* ("*Liepa*"). Applicant respectfully traverses this rejection as *Matsuura* does not teach or suggest placing garment pieces on the surface of a dummy model and because there is no reasonable expectation that *Liepa* could successfully be modified to practice the claimed invention.

As the Examiner is aware, any analysis under 35 U.S.C. § 103 is governed by the following tenets of patent law:

- (A) The claimed invention must be considered as whole;
- (B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;
- (C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and
- (D) Reasonable expectation of success is the standard with which obviousness is determined.

See MPEP § 2141.

Under these tenets, three basic criteria must be met to establish a *prima facie* case of obviousness: (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings; (2) there must be a reasonable expectation of success; and (3) the prior art references must teach or suggest all the claims limitations. See MPEP § 2142.

Because the cited references either alone or in combination, and without impermissible hindsight, do not teach or suggest the claimed invention as a whole, nor provide any indication as to how one could successfully arrive at the claimed invention as a whole, applicant respectfully asserts the pending claims define non-obvious subject matter and are allowable over these references.

As is clear from the above-identified application, the present invention relates to a method and apparatus for viewing a garment made up of garment pieces on a virtual tailor's dummy.

*Matsuura*, discussed in the application on page 3, describes one such method and apparatus wherein the initial steps comprise inputting three-dimensional ("3D") coordinates for the virtual dummy, or "dress form," and inputting 3D shape dimensions of the garment pieces, or "sewing patterns." (Col. 3, ll. 64-67; Col. 4, ll. 1-3). The shape of the assembled garment pieces is then estimated by expanding the 3D shape of the dummy until it agrees with the major dimensions (*e.g.*, the neck, the shoulders, or the bust) of the garment pieces. (Col. 8, ll. 27-32). As described in the application, computing the expansion in accordance with *Matsuura* is quite complex. Such computation involves identifying corresponding characteristic points on the dummy and on the pieces of each garment, and computing the lengths of characteristic arcs going through, *inter alia*, the neck, the shoulders, the chest, and the bust. (Col. 9, ll. 22-30). An expansion factor must also be derived for each of the arcs. (Col. 8, ll. 46-60).

In view of the above complexities and problems facing the prior art, the present inventors have made an effort to overcome these and other problems by creating a method and apparatus for simulating the dressing of a dummy that requires less computation time and ignores geometrical constraints.

Thus, the features of the present invention reside in that the garment pieces are placed on the surface of the dummy and then relaxed from their positions on the surface of the dummy to equilibrium positions on the dummy. Accordingly, the present invention avoids the complex expansion computations required to deform the dummy. Further, the present invention is not dependent on the nature of the dummy model or the type of garment. In

contrast to the teachings of *Matsuura*, the present invention defines the garment pieces for dressing the dummy in two dimensions rather than three dimensions. Moreover, the relation between the garment and the dummy of the present invention is of a topological nature. By ignoring the geometrical aspects of the garment pieces during the dressing of the dummy (*i.e.*, the garment pieces are placed and joined together on the dummy model by simply taking into account the topological properties), the present invention avoids having to compute the physical behavior of the garment pieces prior to assembly.

Applicants respectfully submit that the references, considered as a whole, do not render Claims 1 and 22 *prima facie* obvious.

Independent Claims 1 and 22, and the dependent claims thereof, include the element of “placing the garment pieces on the surface of the dummy model.” Applicants respectfully submit that *Matsuura* does not teach this element of the claimed invention. As described above, *Matsuura* teaches expanding the surface of the dummy toward the major dimensions of the garment pieces. In order to practice the method of *Matsuura*, the garment pieces must necessarily be placed at some distance from the surface of the dummy, rather than on the surface of the dummy.

In one aspect of the present invention, the garment pieces are pressed against the dummy as a result of two successive one-to-one correspondences: (1) a first bijection, between the dummy in 3D and a projection of said dummy in two dimensions (“2D”); and (2) a second bijection, between the projection of the dummy in 2D and the corresponding piece of garment in 2D. (Applicants’ Specification, p. 17 ll. 29-35).

By contrast, *Matsuura* describes expanding the surface of the dummy until it agrees with only the major dimensions of the garment pieces – a method that must begin with a separation between the surface of the dummy and the garment pieces, and is said to result in margins between the surface of the dummy and the garment pieces. (*Matsuura*, col. 4, ll. 32-36).

Because all the claim limitations must be taught or suggested by the prior art to establish *prima facie* obviousness of a claimed invention (*See* MPEP § 2143.03) and because *Matsuura* does not teach or suggest placing the garment pieces on the surface of the dummy

model, Applicants respectfully submit that the references do not render Claims 1 and 22 *prima facie* obvious.

Moreover, Applicants submit that there is no reasonable expectation that *Liepa* could successfully be modified to practice the claimed invention.

*Liepa* describes a method for generating a planar, or 2D, map out of a 3D surface. The 3D surface has edges and vertices, wherein the vertices are the points at which two or more edges meet. (Col. 4, ll. 39-45). The disclosed method comprises first defining a surface boundary on the 3D surface. (Col. 4, ll. 59-60). The surface boundary may be envisioned as the “open top” of the 3D surface and forms the boundary for the planar, 2D map as a result of “flattening out” the 3D surface. (Col. 7, ll. 3-6; Col. 7, ll. 49-52). Once the planar map is generated by mapping the surface boundary on the 3D surface to a 2D map boundary, a relaxation technique is applied. (Col. 7, ll. 49-56). Importantly, however, the relaxation technique is only applied to those vertices from the 3D surface that did not form a surface boundary, *i.e.*, vertices that are not on a boundary of the 2D map. *Id.*

Thus, *Liepa* teaches a cartographic type projection, *i.e.*, the flattening of a 3D surface into a 2D surface. The claimed invention, on the other hand, is generally directed to the inverse of the *Liepa* process, namely, the visualization of 2D surfaces assembled on a 3D model. Consequently, the technical field of and problems addressed by *Liepa* are significantly different from that of the claimed invention.

Although *Liepa* mentions that an inverse process can be applied for the construction of apparel, such as garments, out of pieces of cloth (*Liepa*, col. 1, ll. 29-34), *Liepa* does not provide any indication as to how one could successfully arrive at the claimed invention. Further, any expectation of success would be unreasonable given that the process of flattening the 3D surface into a 2D surface described in *Liepa* is not continuous and does not result in a one-to-one relationship. In addition, because the boundary resulting from the *Liepa* process remains fixed, modifying *Liepa* to practice the claimed invention would result in non-compliance with the outlines of the garment pieces.

In accordance with the claimed invention, the whole garment is relaxed (*i.e.*, deformed uniformly), preferably by seeking a traction energy minimum. Then, a set of large

sub-pieces of the garment are deformed, followed by sets of smaller and smaller portions. The deformations are gentle, *i.e.*, continuous and differentiable, and preferably having derivatives that are continuous. Each point is thus displaced as a function of its position in three dimensions and not as a function of its position relative to its adjacent points. (Applicants' Specification, p. 20, ll. 13-37).

Thus, the relaxation step of the claimed invention brings each garment piece toward its equilibrium state by minimizing the energy state of the fabric, which is initially very high because of the preceding topological process of applying the garment pieces against the dummy model. (Applicants' Specification, p. 19 ll. 9-19). In other words, the relaxation step of the claimed invention consists of releasing or liberating the garment pieces, in some portions, from against the dummy model in order to find the correct drape of the garment.

The relaxation technique taught by *Liepa* is unlike the relaxation technique of the present invention because it consists of displacing the vertices of the 2D map with respect to the surface boundary which is treated like a rigid framework. (*Liepa*, col. 10 ll. 43-61 and col. 11 ll. 1-19). Accordingly, the simulated system is allowed to relax while constrained to the 2D plane. (Col. 10 ll. 30-31).

Thus, even if the inverse process (*i.e.*, the process of constructing a 3D surface out of a 2D surface) was attempted in accordance with the teachings of *Liepa*, the result would consist of deforming the surface primitives while being constrained on the already constructed 3D surface (*i.e.*, without releasing some of the surface primitives from the 3D surface).

Accordingly, if a person having ordinary skill in the art would have (at the time the present invention was made) modified the method of *Matsuura* to include the inverse process (mentioned but not described) of *Liepa*, he would have obtained a garment entirely constrained about the dummy model which would have been a solution inconsistent with that provided by the present invention.

In other words, the combination of *Matsuura* and *Liepa* do not disclose any subject matter that would have encouraged a person having ordinary skill in the art to leave the field of geometry in favor to that of topology, which is the main aspect of the present invention.

As Claims 2-6, 8-9, and 12-20 are dependent on Claim 1 and Claims 23-30 are dependent on Claim 22, Applicants respectfully traverse the rejection of Claims 2-6, 8-9, 12-20, and 23-30 for the reasons stated above.

Based on the foregoing, Applicants respectfully submit that the rejections are not proper and should be withdrawn. Favorable action at the Examiner's earliest convenience is respectfully requested.

If any additional fees are due in connection with the filing of this Response or the accompanying papers, such as fees under 37 C.F.R. §§1.16 or 1.17, please charge the fees to SGR Deposit Account No. 02-4300, Order No. 041206.030. If an additional extension of time under 37 C.F.R. §1.136 is necessary that is not accounted for in the papers filed herewith, such an extension is requested. The additional extension fee also should be charged to SGR Deposit Account No. 02-4300, Order No. 041206.030. Any overpayment can be credited to Deposit Account No. 02-4300, Order No. 041206.030.

Respectfully submitted,



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